

Air Quality Trends

Air Pollutant Concentrations

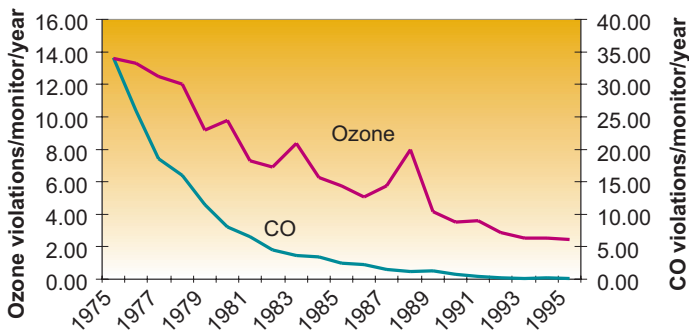
Pollutant	Total Emissions % Change, 1970-1996	Air Pollutant Concentration % Change, 1977-1996
Ozone	-38% (VOC) +8% (NO _x)	-30%
PM ₁₀ *	-25%	-12%
Carbon Monoxide	-31%	-61%
Lead	-98%	-97%

Source: U.S. EPA, Office of Air Quality Planning and Standards. *National Air Quality Emissions Trends Report, 1996*. Research Triangle Park, NC: January 1998, Table 1-2, p. 3, and p. 30.

* Note: PM₁₀ figures are for 1988 to 1996; emissions include only directly emitted particles.

As air pollutant emissions have dropped over time, air quality has improved. Though air quality trends are not available back to 1970, in most cases they are available for the past 20 years. Reductions in air quality concentrations are impressive, with concentrations of carbon monoxide in the air decreasing by more than half and lead concentrations virtually eliminated. All the years throughout the 1990s have had better air quality than any of the years in the 1980s, showing a steady trend of improvement.

Exceedances per Monitor



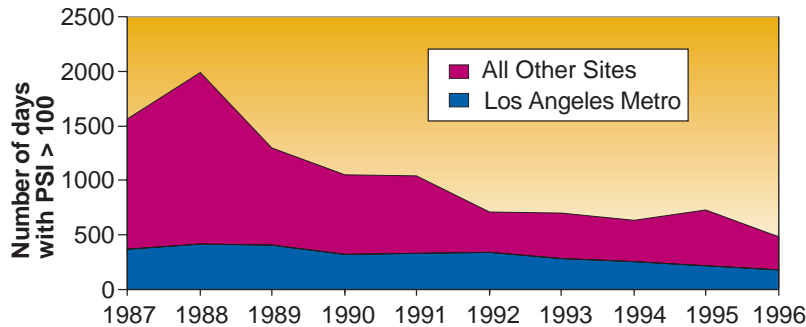
As air pollutant concentrations have fallen, the number of exceedances of air quality standards has fallen dramatically across the U.S.

Source: Tabulated from EPA's Aerometric Information Retrieval database. See FHWA. *VMT Growth and Improved Air Quality: How Long Can Progress Continue?*, 1997. Figure 1, p. 1.

Note: A violation occurs if the CO standard is exceeded more than once per year or if the 1-hour ozone standard is exceeded on average more than once per year over a three-year period.

Air Quality Trends

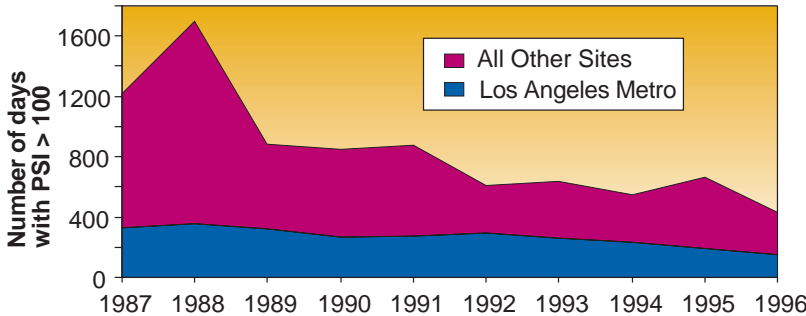
PSI Days Measured for Selected Trend Sites



The Pollutant Standards Index (PSI) is a composite measure of pollutant concentrations. A PSI value of 100 or greater indicates that at least one criteria pollutant (with the exception of NO₂) exceeded the level of the NAAQS, meaning that air quality is in the unhealthful range on that day.

PSI days have decreased 69% between 1987 and 1996. The number of PSI days decreased from 372 to 182 in the Los Angeles Metro Area (Los Angeles-Long Beach and Riverside-San Bernardino.) PSI days in all other parts of the country decreased from 1,193 to 298 over this time period.

PSI Days for Ozone

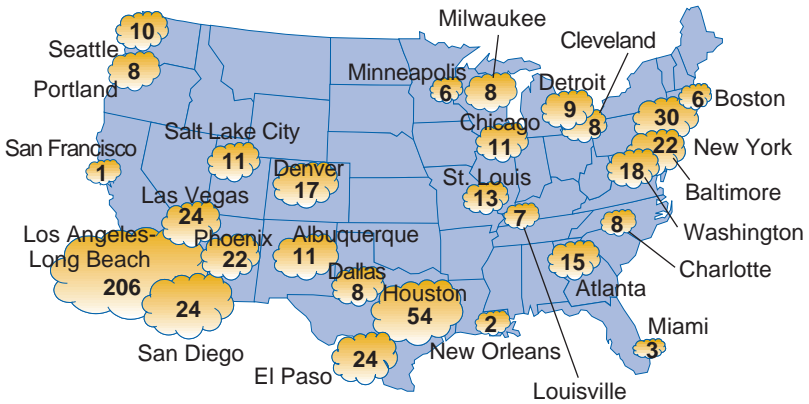


Ozone accounts for the majority of days with PSI values above 100, and reflects success in achieving lower CO and PM₁₀ concentrations. The number of days that trend sites have exceeded acceptable ozone levels declined by 65% between 1987 and 1996.

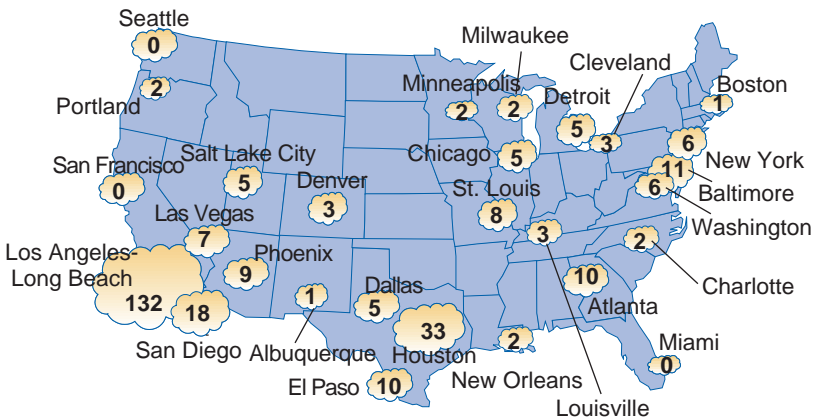
Source: U.S. EPA, Office of Air Quality Planning and Standards. *National Air Quality and Emissions Trends Report, 1996*. January 1998. Table A-18, p. 148.

Air Quality Trends

PSI Days, 1987-91 Annual Average



PSI Days, 1992-96 Annual Average

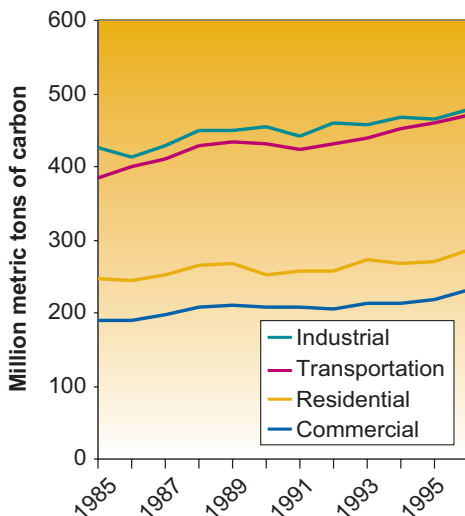


The clouds show the average annual number of days that exceeded federal air quality standards, based on PSI measurements. During the most recent five year period, 1992-96, major metropolitan areas experienced, on average, less than half as many PSI days as in the preceding five year period. Out of 84 metropolitan areas, all but two showed a decrease in the number of PST days.

Source: U.S. EPA, Office of Air Quality Planning and Standards. *National Air Quality and Emissions Trends Report, 1996*. January 1998. Table A-16, pp. 144-145.

Greenhouse Gas Emissions

Carbon Dioxide Emissions, 1985–96



Change in Total
CO₂ Emissions: +17%

Change in Transportation
CO₂ Emissions: +22%

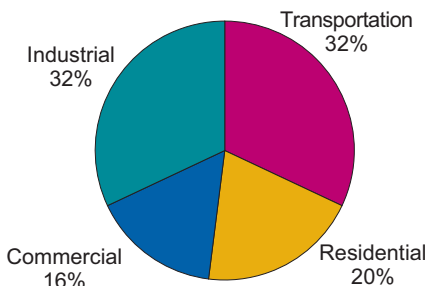
Greenhouse gases trap heat within the earth's atmosphere. Although most greenhouse gases occur naturally and help to keep the Earth hospitable to life, they are also generated by human activities.

Carbon dioxide (CO₂) is a greenhouse gas emitted predominantly by natural sources but also

during the process of fuel combustion. Scientists believe that human activity is contributing to changes in the planet's temperature that could lead to harmful effects, such as sea level rise and changes in global hydrological patterns. Although the U.S. only makes up 4% of the world's population, the U.S. emits 23% of CO₂ from fossil fuel combustion.

In contrast to criteria pollutants, national emissions of greenhouse gases and energy usage have been rising from all sectors. Transportation—including all modes of travel—has been the fastest growing sector in terms of carbon dioxide emissions. Transportation contributes 32% of national CO₂ emissions.

CO₂ Emissions, 1996



Source: U.S. DOE, Energy Information Administration. *Emissions of Greenhouse Gases in the United States 1996*. October 1997. Tables 8, 9, 10, and 11.

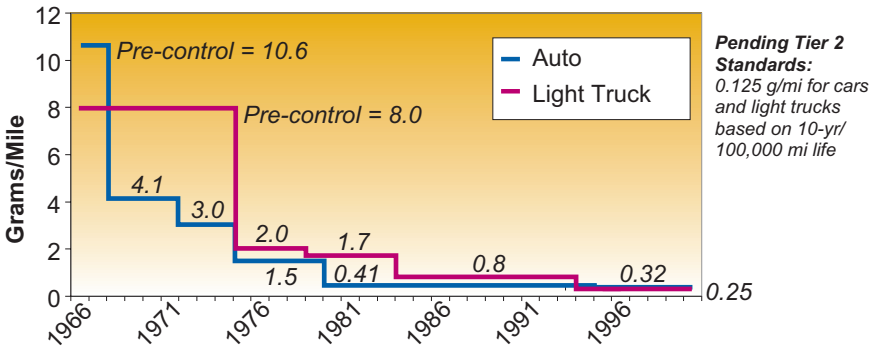
Emissions Standards

Federal Emissions Standards

The Clean Air Act of 1963 and its subsequent amendments set federal emissions control standards for all new cars and light trucks sold in the U.S. The most recent Clean Air Act Amendments (CAAA) in 1990 established more restrictive “Tier 1” emissions control standards, which became effective in 1994.

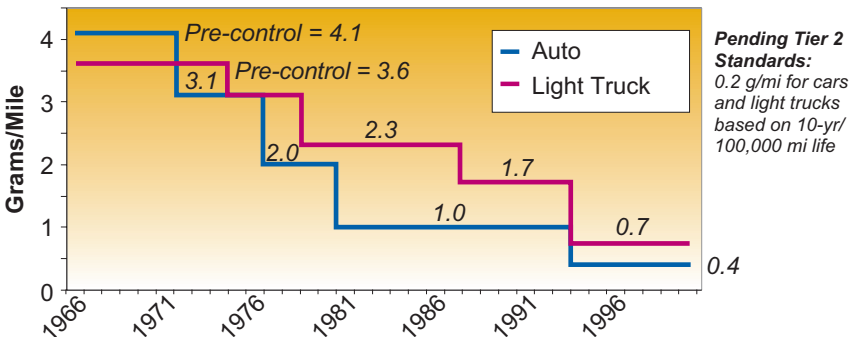
Tier 2 Standards: The CAAA requires EPA to study whether more stringent—Tier 2—standards are needed to meet the NAAQS. If EPA determines that new standards are needed and cost-effective, they would take effect after January 1, 2003 but no later than model year 2006.

VOC (Non-methane Hydrocarbons)

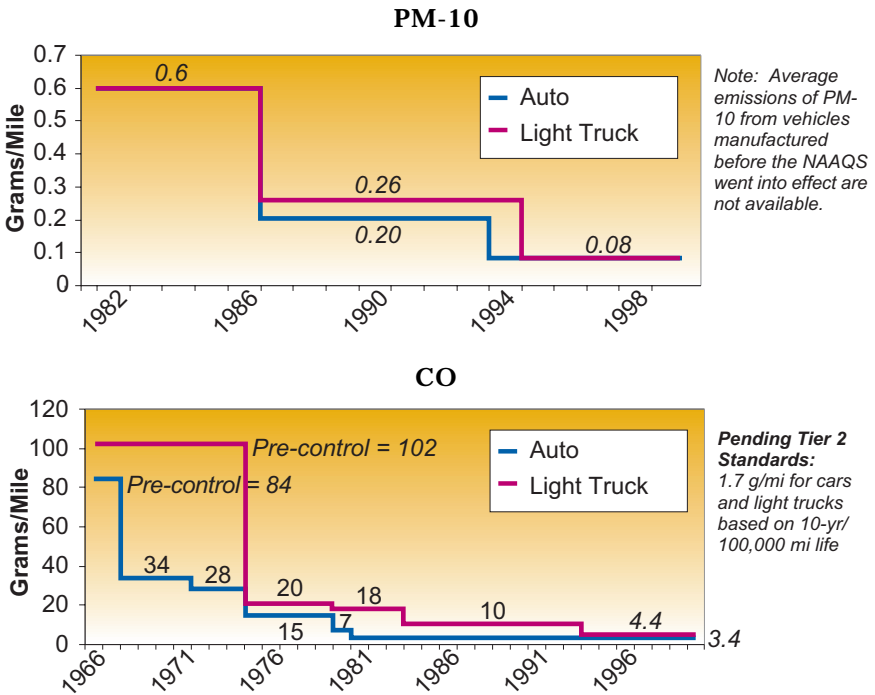


Note: Standards have been phased in over time. The emission standards shown in these graphics are based on a useful life of 5-years/50,000 miles. Light truck emission standards apply to trucks between 3,751 – 5,750 lbs. loaded vehicle weight (LVW) for 1994 – 1999. Different standards apply for lighter and heavier light-duty trucks.

NO_x



Emissions Standards



Source: U.S. Department of Energy. *Transportation Energy Databook: Edition 17*. August 1997. Table 7.12. American Automobile Manufacturers Association. *Motor Vehicle Facts & Figures 1997*. pp. 83-84.

National Low Emission Vehicle (NLEV) emission standards

The National Low Emission Vehicle (NLEV) program is a voluntary program between auto manufacturers, EPA and states. Under the National LEV program, auto manufacturers agreed to comply with tailpipe standards that are more stringent than EPA can mandate prior to model year 2004. In return, EPA and the states agreed to provide manufacturers with regulatory stability and not to impose the stricter California motor vehicle emissions standards. Through this voluntary program, cars significantly cleaner than the law requires will be available in various states in the 1999 model year (fleet average NMHC emissions of 0.148 g/mi. in 1999 and lower thereafter) and elsewhere across the country by 2001.

Source: 40 CFR Part 86, "Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines: Finding of National Low Emission Vehicle Program in Effect."

Emissions Standards

California Emissions Standards

California's Phase 1 Low-Emissions Vehicle (LEV) regulations provide for reduced emission vehicles to be available to consumers. Emission standards have been set for four categories of vehicles:

- ◆ Transitional low-emission vehicles (TLEVs)
- ◆ Low-emission vehicles (LEVs)
- ◆ Ultra-low-emission vehicles (ULEVs)
- ◆ Zero-emission vehicles (ZEVs)

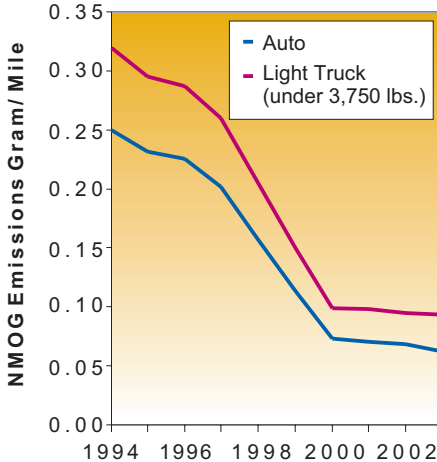
Grams per Mile

Vehicle	HC	CO	NO _x
CV	0.25	3.4	0.4
TLEV	0.125	3.4	0.4
LEV	0.075	3.4	0.2
ULEV	0.04	1.7	0.2
ZEV	0	0	0

CV = Conventional Vehicle

California Non-Methane Organic Gases (NMOG)

Fleet Average Requirements



California law requires that 10% of the new vehicles sold in 2003 be ZEVs and that new fleet average non-methane organic compound emission rates decline each year, as shown in the graph. The emission rate requirements can be met by any combination of vehicle types.

In November 1998, the California Air Resources Board approved the second phase of the state's low-emission vehicle standards – LEV II. The new standards require further reductions in all regulated

emissions for passenger cars through 2010, and for the first time extend the same standards to most minivans, pickup trucks and sport utility vehicles. LEV-II establishes a market-based system to reach the 10% ZEV requirement by 2003; automakers can obtain credits for vehicles that meet a new super ultra low emissions vehicle (SULEV) standard.

Source: California Air Resources Board. "Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-duty Trucks, and Medium-duty Vehicles."